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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,298	10/25/2003	Donald G. Chamberlain	Geo-X 009.01	1480

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EXAMINER	
HUGHES, SCOTT A	
ART UNIT	**PAPER NUMBER**
3663	

DATE MAILED: 08/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/693,298	CHAMBERLAIN ET AL.	
	Examiner	Art Unit	
	Scott A Hughes	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 25 May 2006.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 39-47,51,52,54 and 56-66 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 39-47,51,52,54 and 56-66 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 10/25/2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 5/25/2006 with respect to applicant's objection to the Final Rejection of the claims in the prior office action have been fully considered but they are not persuasive. Applicant's arguments for the withdrawal of the Final Rejection are not persuasive.

Applicant argues that the claims 39-65 were rejected and that the rejection was made Final when it was a first review on the merits of these claims. Claims 39-65 were not present in the first set of claims submitted by the applicant. The application was originally filed with claims 1-12 being present. Responsive to an office action dated 3/16/2005, applicant cancelled all originally submitted claims 1-12 and submitted new claims 13-65. These newly submitted claims were submitted in an amendment to the claims, and are viewed as an amendment to the claims. Applicant received a first action on original claims 1-12 and chose to amend the claims by canceling claims 1-12 and submitting new claims. The second action on the claims was made on elected clams 39-65. This action was made Final because the second action was necessitated by applicant amending the claims by canceling original claims 1-12 and submitting new claims 13-65 in the amendment. Therefore, the Final action was not a first review on the merits of the claims, but was rather a second review of the claims, which were elected claims 39-65 submitted by applicant in response to the first action on original claims 1-12. Since the second action on the merits of the claims was necessitated by

applicant's amendments to the claims by canceling claims 1-12 and submitting new claims, the Final rejection of the claims was proper.

Applicant's arguments and amendments filed 5/25/2006 are sufficient to overcome the objections to claims 46 and 53.

Applicant's arguments with respect to claims 39-47, 51, 52, 54 and 56-66 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 39, 41-47, 52, 54, and 56-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bary in view of Ericsson.

With regard to claim 39, Bary discloses a seismic survey network. Bary discloses a plurality of data processing modules RTU,RSS (Fig. 1) and a central recording unit CCU. Bary discloses that a first portion of the data processing modules includes seismic data acquisition modules have a first clock means and an assisted global positioning system receiver (Column 3, Lines 10-65; Columns 4-6; Column 8, Lines 33-45). Bary discloses means for detecting the time of arrival at each dependent station and counting means associated with the local clock for performing a second dating of the time of arrival in according with the external clock (GPS signal from

satellite). Therefore, each dependent station has an internal clock and a receiver that communicated with the GPS satellite signals. In Fig. 1, Bary shows that all units in the system have a means for receiving the GPS satellite signal (H). This signal provides timing information, and therefore the device inside each of the units that receives the signal is a clock means that acquired the GPS timing signal. Bary discloses that the central processing data unit has a second clock means and a master global positioning system receiver (Column 3, Lines 10-65; Columns 4-5; Column 8, Lines 33-45; Column 9, Line 6 to Column 10, Line 21). Bary discloses that the CCU can also receive GPS signals, and therefore it has a GPS receiver. Bary discloses that the GPS signals are used by a processor and a clock (master clock) in the CCU for timing the data and for synchronization. Bary discloses each of the data acquisition modules RTU having one or more seismic sensors R with respective specific identities operatively connected thereto (Column 5, Line 61 to Column 6, Line 15) for transmission of seismic data to the respective data acquisition module. Bary discloses that the receivers R are separated into specific groups connected to different data acquisition units. Bary discloses the survey network further comprising a communication network (LAN) connected among the data processing modules and the central recording unit linking the master GPS receiver and the assisted GPS receivers (Column 3, Lines 10-65; Column 4, Line 58 to Column 5, Line 22; Column 6). Bary does not disclose the master GPS receiver transmitting to the assisted GPS receivers over the communication network satellite tracking assistance data and current best-estimate data of the assisted GPS receiver location. Bary does not disclose the assisted GPS receiver transmitting to the master

GPS receiver fro processing and storage, over the communication network, satellite tracking data collected by the assisted GPS receiver. Bary discloses that an external GPS satellite signal is provided to the units of the system. Bary discloses that the central station comprises a clock that is used as a master clock associated with the GPS timing signal by a GPS receiver to synchronize the system. Bary does not disclose that the master GPS receiver in the central recording unit obtains satellite tracking assistance data and best-estimate data of the assisted GPS receivers in the acquisition units and local concentration stations nor that the assisted GPS receivers send satellite tracking information to the master GPS. Ericsson teaches a GPS network that uses a master GPS receiver in a base unit as a reference for assisted GPS units in the network (Fig. 2) (Pages 5-10). Ericsson teaches that the both the reference GPS unit and the GPS units in the network units provide satellite tracking and position updates to the other GPS units in the network to assist in obtaining the GPS signal from the satellites and transferring its information to the GPS receivers in the network (Pages 5-10). It would have been obvious to modify Bary, who relies on the GPS signal at each of the units in a seismic survey network, to include the assisted GPS technology taught by Ericsson in order to able to provide better coverage of the entire survey area with the GPS satellite signals so that receivers that lose the signal due to terrain blockage can still be covered by the GPS signals.

With regard to claim 41, Bary discloses that the time of the first clock means is synchronized to GPS reference time by the assisted GPS receiver (Column 4, Lines 45-52).

With regard to claims 42-43, Bary discloses that the other unit is a base line or line tap unit (RSS) (Fig. 1). When the devices are connected by cables, the RSS units are read as base line and line tap units since they collect data from a group of data acquisition modules and transmit it along a base line to the central recording station.

With regard to claim 44, Bary discloses that the central recording unit transmits second clock synchronization signals corresponding to the time of the second clock means for receipt and re-transmission along the communication network (abstract; Columns 8-9).

With regard to claim 45, Bary discloses that the time of the second clock means is synchronized to GPS satellite reference time by the master GPS receiver (Column 4, Lines 25-35, 45-62) and that the first data acquisition modules comprise means responsive to a second clock synchronization signal to coordinate the time of the first clock means to the time value of the second clock means (Column 3; Column 4, Line to Column 5, Line 21; Column 8 Line 15 to Column 9).

With regard to claim 46, Bary discloses that the communication network comprises a plurality of data transmission increments serially linking respective data acquisition modules, other data processing modules, and the central recording unit, each of the increments having a predetermined data propagation time interval, the data propagation time intervals of data transmission increments adjacent each module and unit being programmed in the respective module and unit as a reference value for synchronizing the time reported by the first clock means to the time reported by the

second clock means (Column 1, Lines 15-31; Column 3, Lines 10-65; Column 4, Line 15-65).

With regard to claim 47, Bary discloses that the specific identity of a seismic sensor source of a seismic data packet is implicitly distinguished by the sequential reception order of the data packet by the central recording unit (Column 1, Lines 15-31).

With regard to claims 52, Bary discloses that the second clock means is a master clock of greater precision than the first clock means (Column 5, Lines 1-21; Column 8, Lines 33-45; Columns 9-10). Bary discloses that the master clock (clock in the CCU) is responsible for creating the synchronization signal that synchronizes the clocks in the other units of the system. Therefore, the master clock is more precise since the other clocks are set according to its time.

With regard to claims 54, Bary discloses that each device in the network has a clock that is synchronized by the synchronization signal from the CCU and from GPS signals. The network is made up of different levels of transmission devices that make up the processing modules, with RTU units connected to a higher level of RSS units connected to the CCU. Therefore, there would be three levels of clocks – RTU clocks, RSS clocks, and CCU clock. The CCU synchronizes the RSS units and synchronizes the RTU units through the RSS units. Therefore the third clock of the RSS units is more precise than the RTU clock since they are more complicated units and are used to synchronize the clocks of the RTU. The third clock is also less precise than the master clock since it is synchronized by the master clock.

With regard to claim 56, Bary discloses that the master GPS is utilized to communicate respective GPS information to respective data acquisition modules over the seismic survey network and the assisted GPS receivers use the information to improve their computation of the current time (abstract; Columns 3-4; Column 5, Lines 1-21, Column 8, Lines 34 to Column 10, Line 25).

With regard to claims 57-58, Bary does not disclose that the master GPS receiver utilizes global positioning information comprising accumulated GPS signals and related data sent by the data acquisition modules to improve the accuracy of its computation of their positions. Ericsson discloses the use of GPS satellites and receivers in a system with different levels. Ericsson discloses that positioning and timing data can be communicated through GPS signals from satellites, network nodes, and individual receivers (Fig. 2) (Pages 5-9). It would have been obvious to modify Bary to include using the position information sent among the network as taught by Ericsson to improve the positioning of the acquisition units by the CCU in order to generate a more detailed and precise map of where the seismic data was obtained.

With regard to claim 59, Bary does not disclose that position coordinates of the data acquisition modules computed by the master GPS receiver are communicated to the respective data acquisition module by data packet communication over the seismic network. Ericsson discloses that the position information in GPS networks using assisted GPS receivers is sent in data packets over a network linking all devices containing GPS receivers and the GPS satellites (Figs. 2-4) (pages 5-9). It would have been obvious to modify Bary to include sending position coordinates computed by a

master GPS over the network as taught by Ericsson in order to provide better GPS coverage for the entire terrain being surveyed.

With regard to claim 60, Bary does not disclose that the data acquisition modules use the position information to compute a best estimate of time utilizing signals they receive from GPS satellites. Ericsson discloses that an accurate time reference is an optional element of positioning assistance data. It would have been obvious to modify Bary to use this time reference in the positioning data as taught by Ericsson to provide a time reference to synchronize the time of the system.

With regard to claim 61, Bary does not disclose improving satellite tracking. Ericsson discloses that receivers on a base station (second receiver, CCU of Bary) are used to communicate information to individual units (assisted GPS receivers in acquisition modules of Bary) to improve satellite-tracking processes (Page 3 to Page 5). It would have been obvious to modify Bary to include communicating information to improve satellite tracking as taught by Ericsson so as to be able to continuously receive GPS signals for system timing purposes.

With regard to claim 62, Ericsson discloses that the information contains current and future locations and identifications of available satellites (Pages 1-6). Ericsson discloses that satellite locations are known and that the positions of satellites are sent among the network in order to continuously receive GPS signals. If the position information of satellites were not distributed, then receivers would lose the GPS signal.

With regard to claim 63, Bary does not disclose global positioning receivers in the acquisition units (assisted receivers) receiving assistance in their position

determinations. Ericsson discloses that individual receivers (assisted receivers) receive assistance in computing position and time from master GPS receivers by data packet communication (Fig, 2) (Page 5). It would have been obvious to modify Bary to include using the position information sent among the network as taught by Ericsson to improve the positioning of the acquisition units by the CCU in order to generate a more detailed and precise map of where the seismic data was obtained.

With regard to claims 64-65, Bary does not disclose utilizing GPS system information to improve accuracy of positioning computation by the data acquisition units which have assisted GPS receivers (receivers that receive signal H from satellites). Ericsson discloses that a master GPS receiver communicates GPS information to another module over a network, with the information being utilized by the module to improve accuracy of its computation of its own position (Pages 5-9) (Fig. 2). It would have been obvious to modify Bary to include using the GPS network of receivers on the CCU, RSS, and RTU in order to improve the accuracy of position determination as taught by Ericsson in order to generate a more detailed and precise map of where the seismic data was obtained.

With regard to claim 66, Bary discloses a seismic survey network (Fig. 1). Bary discloses a plurality of data processing modules (RTU, RRS) and a central recording unit (CCU) (abstract). Bary discloses a first portion of the data processing modules including seismic data acquisition modules having a first clock means and an assisted GPS receiver (Column 3, Lines 10-65; Columns 4-6; Column 8, Lines 33-45). Bary discloses means for detecting the time of arrival at each dependent station and counting

means associated with the local clock for performing a second dating of the time of arrival in according with the external clock (GPS signal from satellite). Therefore, each dependent station has an internal clock and a receiver that communicated with the GPS satellite signals. In Fig. 1, Bary shows that all units in the system have a means for receiving the GPS satellite signal (H). This signal provides timing information, and therefore the device inside each of the units that receives the signal is a clock means that acquired the GPS timing signal. Bary discloses that the central processing data unit has a second clock means and a master global positioning system receiver (Column 3, Lines 10-65; Columns 4-5; Column 8, Lines 33-45; Column 9, Line 6 to Column 10, Line 21). Bary discloses each of the data acquisition modules RTU having one or more seismic sensors R with respective specific identities operatively connected thereto (Column 5, Line 61 to Column 6, Line 15) for transmission of seismic data to the respective data acquisition module. Bary discloses that the receivers R are separated into specific groups connected to different data acquisition units. Bary discloses the survey network further comprising a communication network (LAN) connected among the data processing modules and the central recording unit linking the master GPS receiver and the assisted GPS receivers (Column 3, Lines 10-65; Column 4, Line 58 to Column 5, Line 22; Column 6). Bary does not disclose the master GPS receiver transmitting to the assisted GPS receivers over the communication network satellite tracking assistance data and current best-estimate data of the assisted GPS receiver location. Bary does not disclose the assisted GPS receiver transmitting to the master GPS receiver fro processing and storage, over the communication network, satellite

tracking data collected by the assisted GPS receiver. Bary discloses that an external GPS satellite signal is provided to the units of the system. Bary discloses that the central station comprises a clock that is used as a master clock associated with the GPS timing signal by a GPS receiver to synchronize the system. Bary does not disclose that the master GPS receiver in the central recording unit obtains satellite tracking assistance data and best-estimate data of the assisted GPS receivers in the acquisition units and local concentration stations nor that the assisted GPS receivers send satellite tracking information to the master GPS. Ericsson teaches a GPS network that uses a master GPS receiver in a base unit as a reference for assisted GPS units in the network (Fig. 2) (Pages 5-10). Ericsson teaches that the both the reference GPS unit and the GPS units in the network units provide satellite tracking and position updates to the other GPS units in the network to assist in obtaining the GPS signal from the satellites and transferring its information to the GPS receivers in the network (Pages 5-10). It would have been obvious to modify Bary, who relies on the GPS signal at each of the units in a seismic survey network, to include the assisted GPS technology taught by Ericsson in order to able to provide better coverage of the entire survey area with the GPS satellite signals so that receivers that lose the signal due to terrain blockage can still be covered by the GPS signals. Bary discloses that the data acquisition modules include operational programs to convert instants of seismic data values at predetermined time intervals to signal transmissions in the form of digital data packets that are respectively distinguished by the first clock time of the instant that the respective seismic data is received and by the specific identity of the seismic sensor

source of the data (Column 1, Lines 18-41; Column 5, Line 55 to Column 7, Line 16; Columns 8-9). Bary discloses that data packets generated by a first data acquisition module are transmitted along a route that includes receipt and retransmission of the data packets by at least one other data processing module prior to receipt by the central processing unit (Column 6). Bary discloses that each RTU sends the seismic data through the network to an RRS processing module which then retransmits the data on to the central recording unit. Bary discloses that the central recording unit has means to transmit clock synchronization signals to the other data processing module and that the other data processing module has means for retransmission of the synchronization signals along the transmission route in a directions opposite from the data packets (Column 3 to Column 5, Line 22; Columns 9-10). Bary discloses that the seismic data is sent from the receivers up to the central control, and that the synchronization signal is sent in the opposite direction, from central control to the data acquisition units.

Claims 40 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bary in view of Ericsson as applied to claim 39 and further in view of Iseli.

With regard to claim 40, Bary discloses that the data acquisition modules include operational programs to receive and re-transmit seismic data along the communication network toward the central recording unit in the form of seismic data packets (abstract; Fig. 1; Column 5, line 55 to Column 6). Bary does not specifically disclose each seismic data packet being time stamped with the time of the first clock means respective to the particular data acquisition module source of the seismic data packet when the seismic

data is received by the particular data acquisition module for the seismic sensors connected thereto. . Iseli discloses that seismic data sent from a data acquisition unit to a central recording unit have the time annotated onto the data packets ([0030]) and that these times are synchronized to a master clock and therefore the annotated time is the time of the second (master) clock ([0032]; [0045]; [0054-0056]). It would have been obvious to modify Bary to annotate the time from the second clock that is used to synchronize all clocks in the system as taught by Iseli in order to have the time of data acquisition for each signal present in the data packet so that data processing by time will be easier to perform in the central processing unit.

With regard to claims 51, Bary discloses creating digital data from the received seismic signals, but does not disclose specifically that the data packets correspond to the second time and have the second time annotated on the data packet. Iseli discloses that seismic data sent from a data acquisition unit to a central recording unit have the time annotated onto the data packets ([0030]) and that these times are synchronized to a master clock and therefore the annotated time is the time of the second (master) clock ([0032]; [0045]; [0054-0056]). It would have been obvious to modify Bary to annotate the time from the second clock that is used to synchronize all clocks in the system as taught by Iseli in order to have the time of data acquisition for each signal present in the data packet so that data processing by time will be easier to perform in the central processing unit.

Conclusion

The cited prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott A. Hughes whose telephone number is 571-272-6983. The examiner can normally be reached on M-F 9:00am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAH

JACK KEITH
SUPERVISORY PATENT EXAMINER